

**We claim:**

1. A stimulator for osteogenesis and the treatment of osteoporosis, comprising:  
an interferential current generator for generating an interferential alternating current  
output with a base medium frequency of at least 1KHz but no more than 20KHz; and  
5 at least two pairs of surface electrodes connected to said interferential current producing  
generator and located at predetermined locations on a subject's skin surface.

2. The stimulator of claim 1, wherein said interferential current generator comprises:  
a pulse generator that generates digital signal pulses; and  
10 a digital signal processor connected to said pulse generator that processes the digital  
signal pulses to approximate a sine-wave-like output waveform.

3. The stimulator of claim 1, wherein said interferential current generator comprises:  
a pulse generator that generates digital signal pulses; and  
15 a field-programmable gate array connected to said pulse generator that processes the  
digital signal pulses to approximate a sine-wave-like output waveform.

4. The stimulator of claim 1, wherein said interferential current includes a resultant beat  
frequency of no more than 250 Hz.

20 5. A means for generating electrical stimulation of bone to enhance healing and  
effectiveness of biologics for osteogenesis.

6. A stimulator for osteogenesis and the treatment of osteoporosis, comprising:  
25 a pulse generator that generates digital signal pulses;

a digital signal processor connected to said pulse generator that generates a sine-wave-like output waveform that is further processed into first and second circuits; and

two pairs of surface electrodes connected to said digital signal processor and positioned on a subject's skin surface at predetermined locations to produce an interferential current output waveform from said first and second circuits.

7. The stimulator of claim 6, wherein said interferential current output waveform includes a base medium frequency of at least 1KHz but no more than 20KHz.

10 8. The stimulator of claim 6, wherein said interferential current output waveform includes a resultant beat frequency of no more than 250 Hz.

9. A stimulator for osteogenesis and the treatment of osteoporosis, comprising:  
a pulse generator that generates digital signal pulses;

15 a field-programmable gate array connected to said pulse generator that generates a sine-wave-like output waveform that is further processed into first and second circuits; and

two pairs of surface electrodes connected to said field-programmable gate array and positioned on a subject's skin surface at predetermined locations to produce an interferential current output waveform from said first and second circuits.

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10. The stimulator of claim 9, wherein said interferential current output waveform includes a base medium frequency of at least 1KHz but no more than 20KHz.

11. The stimulator of claim 9, wherein said interferential current waveform includes a resultant beat frequency of no more than 250 Hz.

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12. A method for electrical stimulation of bone to promote osteogenesis, said method comprising:

connecting a pulse generator to a digital signal processor and supplying digital signal pulses to said digital signal processor which produces a sine-wave-like current waveform which is further processed and output to first and second pairs of surface electrodes, wherein first and second circuits are created, respectively;

positioning said first pair of surface electrodes on a subject's skin surface at one set of diagonal corners of a targeted area;

positioning said second pair of surface electrodes on the subject's skin surface at the other set of diagonal corners of the targeted area; and

creating an interferential current with a base medium frequency of at least 1KHz but no more than 20KHz.

13. The method according to claim 12, wherein said method further includes varying positions of said first and second pairs of surface electrodes.

14. The method according to claim 12, wherein said method further includes modulating outputs of amplitudes of said first and second circuits.

15. The method according to claim 12, wherein said method includes creating an interferential current with a resultant beat frequency of no more than 250 Hz.

16. A method for electrical stimulation of bone to promote osteogenesis, said method comprising:

connecting a pulse generator to a digital signal processor and supplying digital signal pulses to said field-programmable gate array which produces a sine-wave-like current waveform which is further processed and output to first and second pairs of surface electrodes, wherein first and second circuits are created, respectively;

5        positioning said first pair of surface electrodes on a subject's skin surface at one set of diagonal corners of an incision site;

         positioning said second pair of surface electrodes on the subject's skin surface at the other set of diagonal corners of the incision site; and

         creating an interferential current with a base medium frequency of at least 1KHz but no  
10    more than 20KHz.

17.    The method according to claim 16, wherein said method further includes varying positions of said first and second pairs of surface electrodes.

15    18.    The method according to claim 16, wherein said method further includes modulating outputs of amplitudes of said first and second circuits.

19.    The method according to claim 16, wherein said method includes creating an interferential current with a resultant beat frequency of no more than 250 Hz.

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